Environmental Mimics of Chemical and Biological Warfare Agents

by

David M. Claborn, DrPH

CDR MSC USN

What would a Marine think about when he saw the adults of a village being led about by the children because nearly all of the adults were blind?

An outbreak of blistering disease among Marines in Arizona

Outbreak of 1997 in Barry Goldwater range

Blisters on various parts of the body as well as conjunctivitis

Marines alarmed by similarity to blistering agent like mustard or Lewisite. Wanted to go outside military medical system for help.

Area of outbreak

Damage caused by the *Paederus* beetles includes very large blebs as well as impressive conjunctivitis. Some can be very painful. Outbreaks have been observed nearly worldwide and have caused the complete evacuation of a village

Dermatite epidÍmica por Paederus irritans em Piura, Perÿ, 1999, relacionada ao fenÙmeno El NiÒo
Epidemic dermatits by Paederus irritans in Piura, Perÿ at 1999, related to El NiÒo phenomen
Victor Alva-Dávalos1, Victor Alberto Laguna-Torres2, A. Huamán1,

Rove beetle: Insects in this family can cause a blistering disease that can be confused with a chemical warfare agent

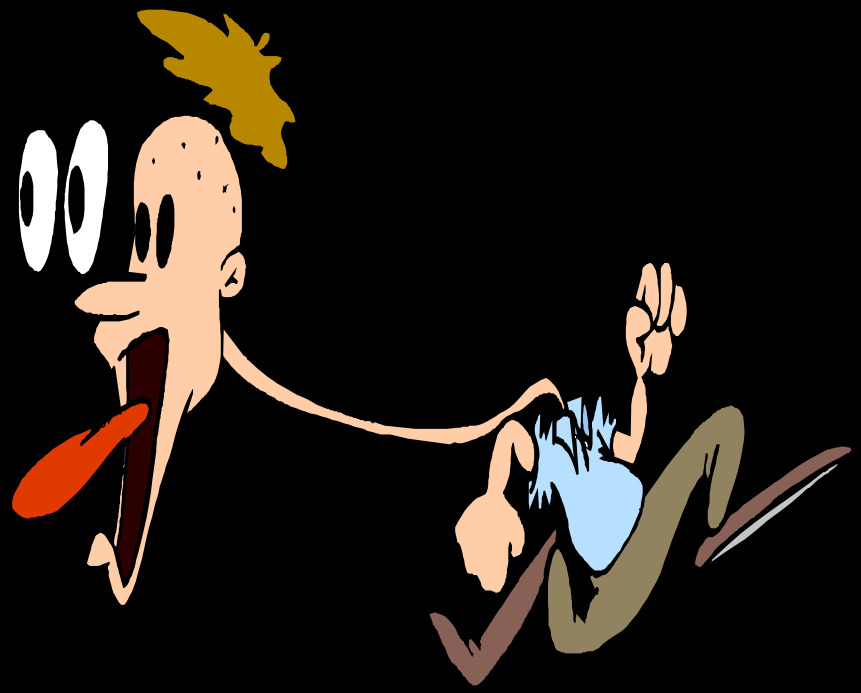
Black Blister Beetle

True blister beetles can cause similar symptoms though the likelihood of confusing them with a chemical warfare agent is remote.

Margined Blister Beetle

What is a chem/bio mimic?

- Def.- an environmental or medical factor which produces symptoms similar enough to those of a chemical or biological agent to cause unwarranted alarm among medical ***or*** non-medical personnel.



Poison ivy dermatitis

Lewisite damage

Chemical warfare training includes pictures of Lewisite damage, but little or no training on how to differentiate between the damage caused by a a war agent and that caused by a common environmental condition.

Which of these images portrays damage caused by a chemical agent? (Hint: one is caused by an autoimmune disease.)

Urticaria caused by phosgene oxime

Many mimics

Some can cause mass symptoms (multiple individuals)

Cause may not be readily apparent

No blistering but rash or urticaria common

CATERPILLARS WITH URTICATING HAIRS

Urticating ‘hairs’ from caterpillars

Nerve Agent Mimics

- Common agents are *Sarin, Tabun*, and *VX*.
- All are organophosphates
- Common organophosphate insecticides are malathion, chlorpyrifos and parathion.
- Difference from war agents: toxicity (primarily)

Symptoms of Organophosphate Poisoning

- Miosis, blurring of vision
- Rhinorrhea
- Salivation
- Breathing difficulty
- Sweating
- Apnea
- Fasciculations
- Paralysis
- Convulsion
- Abdominal pain
- Loss of consciousness
- Nausea, vomiting
- Death

Symptoms of Elapid envenomation:

Drowsiness, weakness, salivation, paresis, weak pulse, reduced blood

pressure, blurring of vision, headache, ptosis, nausea, vomiting,

abdominal pain, slurring of speech, paralysis, death.

Tick paralysis can mimic the actions of chemical warfare agents.

Symptoms:

Ascending paralysis

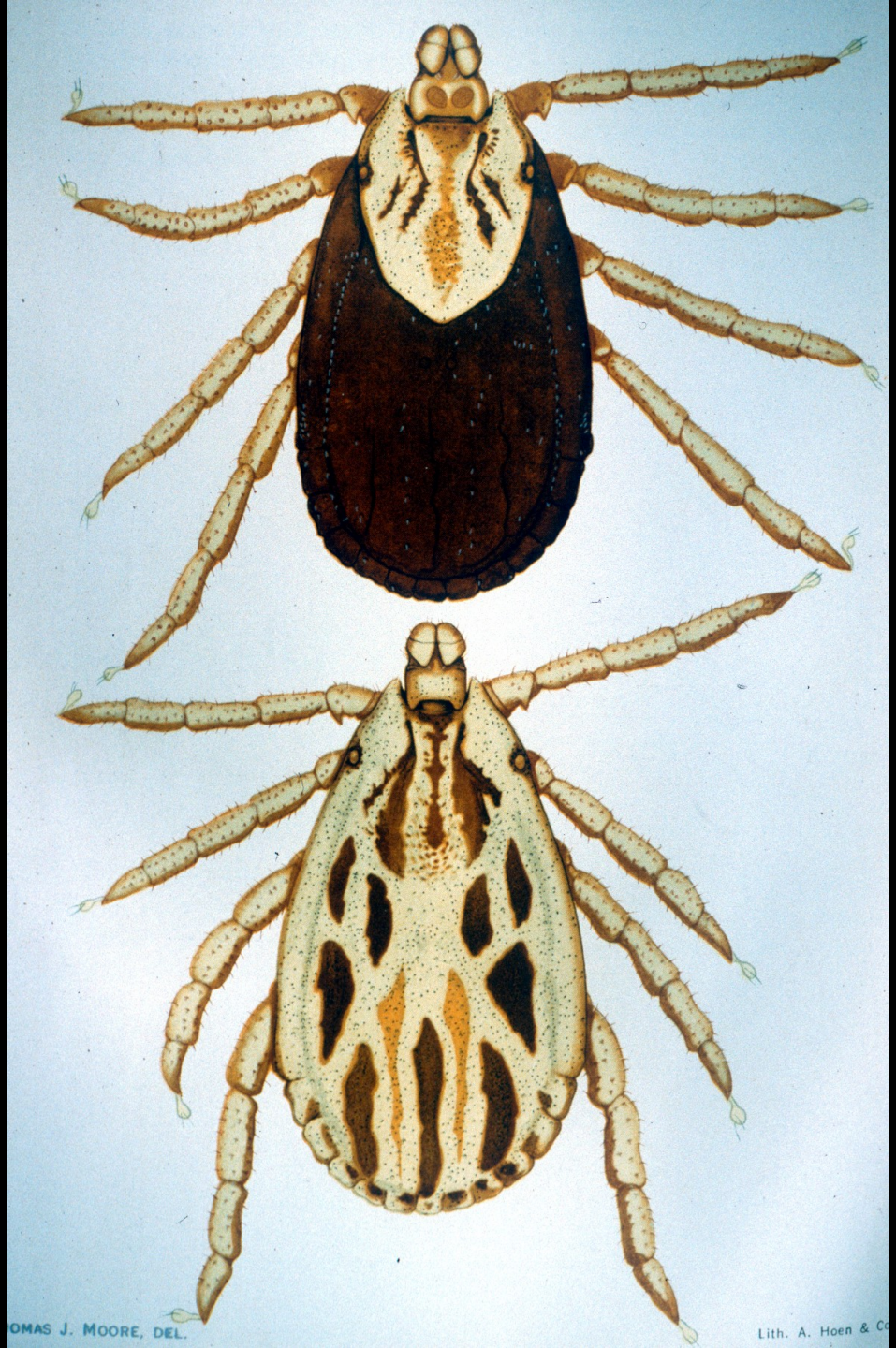
limb numbness

speech difficulties

respiratory paralysis

death

vomiting



NATURALLY OCCURRING DISEASE AND DISEASE AGENTS

Discriminating between war agents and natural events

- Plague
  - Was it preceded by a rodent die-off?
  - Is it manifested as bubonic or pneumonic?
- Other biologicals
  - Has it been weaponized?
  - Does it naturally occur in the region?
  - Are competent vectors present?
  - Are there similar endemic diseases?
- Chemical agents
  - How many individuals are affected?
  - Is the local fauna affected?
  - Are the symptoms only in a certain segment of the population, or are they throughout the community?
  - Did symptoms appear suddenly?